Better Buildings® U.S. DEPARTMENT OF ENERGY

Fact Sheet

BETTER BUILDINGS HIGH EFFICIENCY TROFFER LIGHTING

Better Buildings Alliance High Efficiency Troffer Lighting Specification

The U.S. Department of Energy's (DOE) Better Building Alliance (BBA) is driven and managed by key industry partners whose goal is to transform the energy efficiency of commercial buildings. Members of the BBA Lighting & Electrical Team are working to support the increased use of high-efficiency lighting troffers that are reliable, energy efficient, and competitively priced. With half of all commercial fluorescent lighting fixtures comprised of recessed troffers, the BBA specification provides commercial building stakeholders guidance for taking advantage of opportunities to save energy and money by upgrading to high-efficiency LED technology.

In December 2016, DOE released the BBA High-Efficiency Troffer Lighting Specification (version 6.0) which sets performance requirements for high-efficiency LED troffer products in the 1X4, 2X2, and 2X4 configurations. Lighting troffers are recessed ceiling fixtures that were designed around linear fluorescent technology. Their trough-like shape and downward-facing placement allow light to be distributed evenly and widely.

The BBA specification can be found at https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/High Efficiency Troffer Performance Specification.pdf.

Energy Savings and Other Benefits

High efficiency troffers that meet the specification are up to 70% more efficient on a one-for-one basis compared to traditional fluorescent troffers. Savings can reach 80% if integrated with dimming, occupant, or daylight controls (See Table 1).[1] Maintenance costs are reduced on top of energy bill savings because they need less frequent lamp replacements.

Table 1. Average One-for-One Energy Savings by Troffer Configuration

Configuration	Troffer Upgrade	With Controls
1X4	40%-70%	Up to 80%
2X2	55%-60%	Up to 70%
2X4	40%-68%	Up to 70%

The newest version of high efficiency troffer specification is no longer lighting technology neutral. LED technology is now so readily available that even the most advanced fluorescent systems are unable to meet to mid-range performance levels of LED.

Table 2. Features of LED Technologies

Feature	Description
Light Output and Product Lifetime	Expected life of over 50,000 hours. Higher temperatures reduce product life and must be considered in system design and in maintenace of light levels over time.
Costs	Higher initial cost, but lower energy and maintenance costs.
Dimming and Occupancy Controls	Dimming ability is not automatic, thus driver and dimming electronics must be matched to allow for dimming.
Design Flexibility	Low-profile design allows new building design to maximize floor space.
Durability and Disposal	No mercury contained in the product. Less fragile and therefore less prone to breakage.

[1] Savings based on the characteristics of troffers that are currently installed across the commercial building stock

Troffer Specification Use

Whether constructing a new property, conducting a major retrofit, or simply replacing inefficient fixtures, you can maximize the efficiency of your indoor lighting by installing troffers that meet BBA specifications. Follow the steps below to identify troffers that comply with the specification.

Step 1. Download the full BBA troffer specification at https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/High Efficiency Troffer Performance Specification.pdf.

Step 2. Find products that meet the specification
To find high-efficiency LED troffers, refer to the following organization for a list of qualifying products:

DesignLights Consortium – Provides a qualified products list of high-efficiency LED lighting luminaires at https://www.designlights.org/QPL.

This list is separate from the BBA specifications, but provide a starting point for identifying high-efficiency lighting products. Use the filters to search for products that meet the basic BBA specification requirements for light output, efficacy, and spacing criteria. There will be products on the lists that do not comply, so pay close attention to the BBA requirements.

Step 3. Conduct analysis of energy savings using the Lighting Project Evaluator application at https://www.lightingsolutions.energy.gov/comlighting/login.htm.

The BBA high efficiency troffer specification saves commercial buildings energy and money because it is up to 70% more efficient than traditional fluorescent models.

The Lighting Project Evaluator tool allows you to estimate the energy usage of the lighting in your existing building. Then compare this usage to the proposed installation with your new high-efficiency troffer and see the impact on your energy savings.

Key Specification Requirements

When selecting a high-efficiency troffer, refer to the key specification performance requirements in Table 3.

Table 3. Key BBA Lighting Troffer Specification Performance Requirements

Configuration	Minimum Initial Luminaire Light Output (lumens)*	Minimum Luminaire Efficacy (lm/W)	Spacing Criteria (0° - 180°) or (90° - 270°)**
1X4	1,500	125	1.0 - 2.0
2X2	2,000	125	1.0 - 2.0
2X4	3,000	125	1.0 - 2.0

* Measured according to IESNA LM-79-2008

** Spacing criteria is the ratio of fixture spacing to mounting height and establishes the point at which uniform illumination occurs between fixtures at a given mounting height

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